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126.   (Previously Presented) A method of invoking a service at a first machine, comprising the steps of:

 receiving at said first machine a service invocation request generated at a second machine in compliance with a markup language-based message encoding, wherein said message includes plural elements representing data items of at least one argument and associated with type labels selected from an encoding group having a predetermined number of members, with at least two of said members designating elements containing other elements associated with type labels belonging to said group; and

 invoking said service in response to said request.

127.   (Previously Presented) A method of invoking a service at a first machine from a second machine, comprising the steps of:

 generating a service invocation request message at said second machine in compliance with a markup language-based message encoding, wherein said message includes plural elements representing data items of at least one argument and associated with type labels selected from an encoding group having a predetermined number of members, including at least a first type label for designating an element containing lexical data, and a second type label for designating an element containing other elements associated with type labels selected from said group; and

 transmitting said message .

128.   (Previously Presented) A method of invoking a service at a first machine, comprising the steps of:

 receiving at said first machine a service invocation request message generated at a second machine in compliance with a markup language-based message encoding, wherein said message includes plural elements representing data items of at least one argument and associated with type labels selected from an encoding group having a predetermined number of members, including at least a first type label for designating an

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element containing lexical data, and a second type label for designating an element containing other elements associated with type labels selected from said group; and

invoking said service in response to said message.

129.   (Previously Presented) A method of invoking a service at a first machine, said method comprising the steps of:

receiving at said first machine a service invocation request;

invoking said service in response to said request; and

transmitting from said first machine a service invocation reply message in compliance with a markup language-based message encoding, wherein said message includes plural elements representing data items of at least one argument and associated with type labels selected from an encoding group having a predetermined number of members, including at least a first type label for designating an element containing lexical data, and a second type label for designating an element containing other elements associated with type labels selected from said group.

130.   (Previously Presented) A method of invoking a service at a first machine, said method comprising the steps of:

transmitting a service invocation request from a second machine; and

receiving at said second machine a service invocation reply message in compliance with a markup language-based message encoding, wherein said message includes plural elements representing data items of at least one argument and associated with type labels selected from an encoding group having a predetermined number of members, including at least a first type label for designating an element containing lexical data, and a second type label for designating an element containing other elements associated with type labels selected from said group.

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131.   (Previously Presented) A method according to claim any one of claims 127-130, wherein said encoding group further includes a third type label for designating an element containing other elements associated with type labels selected from said group.

132.   (Previously Presented) A method according to claim 131, wherein said encoding group includes a fourth type label for designating an element containing other elements associated with type labels selected from said group.

133.   (Previously Presented) A method according to claim 131, wherein said encoding group includes a fourth type label for designating an element uniquely identifying another element within a particular message.

134.   (Previously Presented) A method according to claim 131, wherein said encoding group includes a fourth type label for designating the absence of data.

135.   (Previously Presented) A method according to claim 133, wherein said encoding group includes a fifth type label for designating the absence of data.

136.   (Previously Presented) A method according to claim 135, wherein said encoding group includes a sixth type label for designating an element containing other elements associated with type labels selected from said group.

137.   (Previously Presented) A method according to claim 131, wherein said third type label designates an element containing an n-dimensional array (where n is an integer such that $n \geq 1$) of elements associated with type labels selected from said encoding group.

138.   (Previously Presented) A method according to any one of claims 127-130, wherein said encoding provides a lexical type indicator associated with an element having said first type label.

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139. (Previously Presented) A method according to claim 138, wherein an element associated with said first type label with no lexical type indicator is assumed to contain data of string lexical type.

140. (Previously Presented) A method according to claim 138, wherein said mark-up language is XML, said elements are expressed as XML elements, said type labels are expressed as XML element type names, and said lexical type indicator is expressed as an XML attribute on an XML element associated with said first type label, with the lexical type of the data contained in said XML element being designated by the value of said XML attribute.

141. (Previously Presented) A method according to claim 131, wherein said encoding group further includes a fourth type label for designating an element representing a numeric value.

142. (Currently Amended) A method according to claim 131, wherein said encoding group includes multiple lexical-type labels each designating a respective different type of lexical data contained in an <u>associated</u> element-associated-with said first type label.

143. (Previously Presented) A method according to claim 131, wherein said message further includes a semantic label for at least one data item of an argument in said message.

144. (Previously Presented) A method according to claim 143, wherein said mark-up language is XML, said at least one element is expressed as an XML element, and said semantic label is expressed as the value of an XML attribute on said XML element.

145. (Previously Presented) A method of invoking a service at a first machine from a second machine, said method comprising the steps of:

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generating a service invocation request message at said second machine in compliance with a markup language-based message encoding wherein said message includes elements representing data items of at least one argument and associated with type labels selected from a group of type labels, said group including at least an array type label indicating that the corresponding element is an array element representing an n-dimensional array containing a plurality of data items, where n is an integer and n ≥ 1, said message including at least one element associated with said array type label and representing a multi-level nested array where each element nesting level corresponds to a respective dimension of said array; and

transmitting said service invocation request message from said second machine.

146. (Previously Presented) A method of invoking a service at a first machine, comprising the steps of:

receiving at said first machine a service invocation request message generated at a second machine in compliance with a markup language-based message encoding wherein said message includes elements representing data items of at least one argument and associated with type labels selected from a group of type labels, said group including at least an array type label indicating that the corresponding element is an array element representing an n-dimensional array containing a plurality of data items, where n is an integer and n ≥ 1, said message including at least one element associated with said array type label and representing a multi-level nested array where each element nesting level corresponds to a respective dimension of said array; and

invoking said service in response to said message.

147. (Previously Presented) A method of invoking a service at a first machine, said method comprising the steps of:

receiving at said first machine a service invocation request;

invoking said service in response to said request; and

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transmitting from said first machine a service invocation reply message in compliance with a markup language-based message encoding wherein said message includes elements representing data items of at least one argument and associated with type labels selected from a group of type labels, said group including at least an array type label indicating that the corresponding element is an array element representing an n-dimensional array containing a plurality of data items, where n is an integer and n ≥ 1, said message including at least one element associated with said array type label and representing a multi-level nested array where each element nesting level corresponds to a respective dimension of said array; and

transmitting said service invocation reply message from said second machine.

148.   (Previously Presented) A method of invoking a service at a first machine, said method comprising the steps of:

transmitting a service invocation request from a second machine; and

receiving at said second machine a service invocation reply message in compliance with a markup language-based message encoding wherein said message includes elements representing data items of at least one argument and associated with type labels selected from a group of type labels, said group including at least an array type label indicating that the corresponding element is an array element representing an n-dimensional array containing a plurality of data items, where n is an integer and n ≥ 1, said message including at least one element associated with said array type label and representing a multi-level nested array where each element nesting level corresponds to a respective dimension of said array.

Claims 149-152 canceled.

153.   (Previously Presented) A method of invoking a service at a first machine from a second machine, said method comprising the steps of:

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generating a service invocation request message at said second machine in compliance with a mark-up language-based message encoding wherein said message includes elements representing data items of at least one argument and associated with type labels selected from a group including at least an array type label indicating that the corresponding element is an array element representing an n-dimensional array containing a plurality of data items, where n is an integer and $n \geq 1$, said request message including at least one element associated with said array type label and representing an array of dimension n and further including an array label associated with said at least one element and requiring that all data items represented within said array have the same type as one another; and

transmitting said service invocation request message from said second machine.

154.   (Previously Presented) A method of invoking a service at a first machine, comprising the steps of:

receiving at said first machine a service invocation request message generated at a second machine in compliance with a markup language-based message encoding wherein said message includes elements representing data items of at least one argument and associated with type labels selected from a group including at least an array type label indicating that the corresponding element is an array element representing an n-dimensional array containing a plurality of data items, where n is an integer and $n \geq 1$, said request message including at least one element associated with said array type label and representing an array of dimension n and further including an array label associated with said at least one element and requiring that all data items represented within said array have the same type as one another; and

invoking said service in response to said message.

155.   (Previously Presented) A method of invoking a service at a first machine, said method comprising the steps of:

receiving at said first machine a service invocation request;

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invoking said service in response to said request; and

transmitting from said first machine a service invocation reply message in compliance with a markup language-based message encoding wherein said message includes elements representing data items of at least one argument and associated with type labels selected from a group including at least an array type label indicating that the corresponding element is an array element representing an n-dimensional array containing a plurality of data items, where n is an integer and n ≥ 1, said reply message including at least one element associated with said array type label and representing an array of dimension n and further including an array label associated with said at least one element and requiring that all data items represented within said array have the same type as one another; and

transmitting said service invocation reply message from said second machine..

156.   (Previously Presented) A method of invoking a service at a first machine, said method comprising the steps of:

transmitting a service invocation request from a second machine; and

receiving at said second machine a service invocation reply message in compliance with a markup language-based message encoding wherein said message includes elements representing data items of at least one argument and associated with type labels selected from a group including at least an array type label indicating that the corresponding element is an array element representing an n-dimensional array containing a plurality of data items, where n is an integer and n ≥ 1, said reply message including at least one element associated with said array type label and representing an array of dimension n and further including an array label associated with said at least one element and requiring that all data items represented within said array have the same type as one another.

157.   (Previously Presented) A method according to any one of claims 153-156, wherein said array label identifies said same type.

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158.   (Previously Presented) A method according to any one of claims 153-156, wherein said mark-up language is XML, said at least one element is expressed as an XML element, and said array label is expressed as an XML attribute of said XML element such that the dimension n is given by the value of said XML attribute.

159.   (Previously Presented) A method according to any one of claims 145-148 and 153-156, wherein said message is an XML document.

160.   (Previously Presented) A method according to any one of claims 145-148, wherein said message includes a type label associated with the nesting element at each said element nesting level and designating said nesting element as having an array type.

161.   (Previously Presented) A method according to claim 160, wherein said nesting element contains at least one member element representing a data item, with all data items represented by the direct children elements of said nesting element being of the same type as one another.

162.   (Previously Presented) A method according to claim 161, wherein said message includes an array label associated with said nesting element and said array label indicates the type associated with all data items represented by said direct children elements.

163.   (Previously Presented) A method according to any one of claims 145-148, wherein said message includes an array label associated with said nesting element and said array label indicates a value of n but does not indicate a size for each of said n dimensions.

164.   (Previously Presented) A method according to any one of claims 145-148, wherein said message includes an array label associated with said at least one element and requiring that all data items contained within said array have the same type as one another.

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165. (Currently Amended) A method of invoking a service at a first machine from a second machine, said method comprising the steps of:

generating a service invocation request message at said second machine in compliance with a markup language-based message encoding, wherein said message includes elements representing data items of at least one argument and associated with type labels selected from a group including at least a first type label and a second type labels always designating an element containing a data item specifying an ID value, wherein said message associates an element having said first type label with an ID value, and wherein said message includes an element associated with said second type label which specifies said ID value; and

transmitting said service invocation request message from said second machine.

166. (Currently Amended) A method of invoking a service at a first machine, comprising the steps of:

receiving at said first machine a service invocation request message generated at a second machine in compliance with a markup language-based message encoding, wherein said message includes elements representing data items of at least one argument and associated with type labels selected from a group including at least a first type label and a second type labels always designating an element containing a data item specifying an ID value, wherein said message associates an element having said first type label with an ID value, and wherein said message includes an element associated with said second type label which specifies said ID value; and

invoking said service in response to said message.

167. (Currently Amended) A method of invoking a service at a first machine, said method comprising the steps of:

receiving at said first machine a service invocation request;
invoking said service in response to said request; and

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transmitting from said first machine a service invocation reply message in compliance with a markup language-based message encoding, wherein said message includes elements representing data items of at least one argument and associated with type labels selected from a group including at least a first type label and a second type labels always designating an element containing a data item specifying an ID value, wherein said message associates an element having said first type label with an ID value, and wherein said message includes an element associated with said second type label which specifies said ID value; and

transmitting said service invocation reply message from said second machine.

168.   (Currently Amended) A method of invoking a service at a first machine, said method comprising the steps of:

transmitting a service invocation request from a second machine; and

receiving at said second machine a service invocation reply message in compliance with a markup language-based message encoding, wherein said message includes elements representing data items of at least one argument and associated with type labels selected from a group including at least a first type label and a second type labels always designating an element containing a data item specifying an ID value, wherein said message associates an element associated with said first type label with an ID value, and wherein said message includes an element associated with said second type label which specifies said ID value.

169.   (Previously Presented) A method of invoking a service at a first machine from a second machine, said method comprising the steps of:

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generating a service invocation request message at said second machine in compliance with a markup language-based message encoding, wherein said message includes elements representing data items of at least one argument and associated with type labels selected from a group, said group including at least one placeholder type label that designates a placeholder element which represents the absence of data; and

transmitting said service invocation request message from said second machine.

170.   (Previously Presented) A method of invoking a service at a first machine, comprising the steps of:

receiving at said first machine a service invocation request message generated at a second machine in compliance with a markup language-based message encoding, wherein said message includes elements representing data items of at least one argument and associated with type labels selected from a group including at least one placeholder type label that designates a placeholder element which represents the absence of data; and

invoking said service in response to said message.

171.   (Previously Presented) A method of invoking a service at a first machine, said method comprising the steps of:

receiving at said first machine a service invocation request;

invoking said service in response to said request; and

transmitting from said first machine a service invocation reply message in compliance with a markup language-based message encoding, wherein said message includes elements representing data items of at least one argument and associated with type labels selected from a group, said group including at least one placeholder type label that designates a placeholder element which represents the absence of data; and

transmitting said service invocation reply message from said second machine.

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172.   (Previously Presented) A method of invoking a service at a first machine, said method comprising the steps of:

transmitting a service invocation request from a second machine; and

receiving at said second machine a service invocation reply message in compliance with a markup language-based message encoding, wherein said message includes elements representing data items of at least one argument and associated with type labels selected from a group including at least one placeholder type label that designates a placeholder element which represents the absence of data.

173.   (Previously Presented) A method according to any one of claims 169-172, wherein said placeholder element represents a programming language null object reference.

174..   (Previously Presented) A method according to any one of claims 169-172, wherein said placeholder element identifies an element contained elsewhere in said message.

175.   (Previously Presented) A method according to any one of claims 169-172, wherein said message includes a second type label associated with said placeholder element.

176.   (Previously Presented) A method according to any one of claims 169-172, wherein said message includes a semantic label associated with said placeholder element.

177.   (Previously Presented) A method according to claim 175, wherein said message includes a semantic label associated with said placeholder element.

178.   (Previously Presented) A method according to any one of claims 165-168, wherein said encoding permits any element in a message to be associated with an ID which uniquely identifies said element within said message.

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179.   (Previously Presented) A method according to claim 178, wherein said mark-up language is XML, said element is expressed as an XML element, and said ID is associated with said element via an XML attribute on said XML element whose value is said ID.

180.   (Previously Presented) A method according to claim 164, wherein said array label identifies said same type.

181.   (Previously Presented) A method according to any one of claims 125-130 or 145-148, wherein all elements in said message designating data items are associated with type labels.

182.   (Previously Presented) A method according to any one of claims 153-156 or 165-172, wherein all elements of said message representing data items are associated with type labels.

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